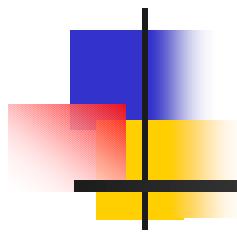
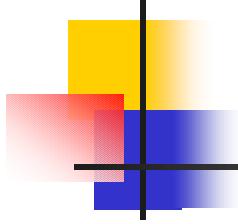


Java CoG Kit

The Present and The Future

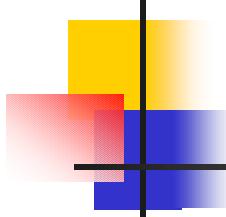


Jarek Gawor, Peter Lane,
Gregor von Laszewski, Nell Rehn



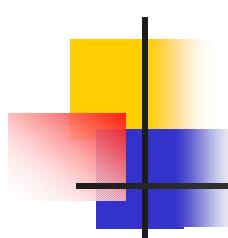
Outline

- What's There Now (in 0.9.11)
- What's New (since 0.9.11)
- What's Coming
- Q&A



What's There Now

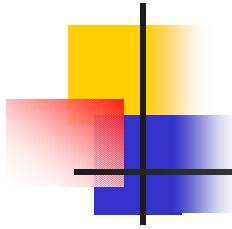
- What is it?
 - Pure Java implementation of Globus/Grid protocols and selected functionality
 - Mostly client side libraries but also some server functionality
- Features
 - Libraries
 - GSI, GRAM, MDS, GASS, GSIFTP, MyProxy, RSL, GARA
 - Command-line tools
 - `globusrun`, `grid-proxy-*`, `globus-url-copy`, `globus-gass-server`, `grid-info-search`, and more



What's New

(since 0.9.11)

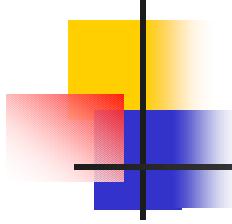
- Not many changes
 - Mostly bug fixes and small updates
- New secure MDS-2 client library
 - Allows the use of GSI to authenticate to the MDS server and optionally 'protect' the communications channel



Secure MDS library

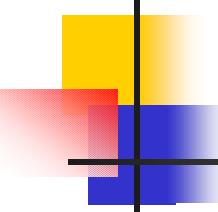
(org.globus.mds.gsi)

- Works with:
 - Netscape Directory SDK for Java
 - JNDI (with Sun's LDAP provider)
- Tested with GSI-enabled OpenLDAP server
- Still in development stage
 - More testing is required
 - More and better documentation and examples are needed
- Minor modifications to client code to use it



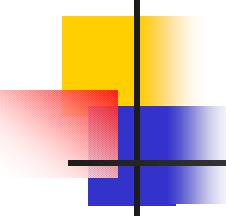
Details

- Simple Authentication and Security Layer (SASL)
 - RFC 2222
 - Java SASL API (I-D: [draft-weltman-java-sasl-05.txt](https://datatracker.ietf.org/doc/draft-weltman-java-sasl-05.txt))
 - Netscape Directory SDK 4.1 implements version 3
 - JNDI (LDAP 1.2.3 provider) implements version 5



JNDI/LDAP Example

```
DirContext ctx = null;  
Hashtable env = new Hashtable();  
  
env.put(Context.INITIAL_CONTEXT_FACTORY, "com.sun.jndi.ldap.LdapCtxFactory");  
env.put("java.naming.ldap.version", "3");  
env.put(Context.PROVIDER_URL, "ldap://globus.isi.edu:5000");  
  
try {  
    ctx = new InitialDirContext(env);  
    Attributes attrs = ctx.getAttributes("o=globus, o=grid");  
} catch(Exception e) {  
    System.err.println("JndiTest failed: " + e.getMessage());  
} finally {  
    if (ctx != null) { try { ctx.close(); } catch(Exception e) {} }  
}
```



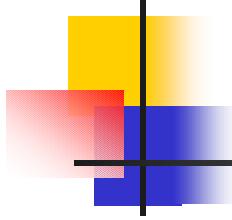
JNDI/LDAP Example

```
DirContext ctx = null;
Hashtable env = new Hashtable();

env.put(Context.INITIAL_CONTEXT_FACTORY, "com.sun.jndi.ldap.LdapCtxFactory");
env.put("java.naming.ldap.version", "3");
env.put(Context.PROVIDER_URL, "ldap://globus.isi.edu:5000");

env.put(Context.SECURITY_AUTHENTICATION, GSIMechanism.NAME);
env.put("javax.security.sasl.client.pkgs", "org.globus.mds.gsi.jndi");
env.put("javax.security.sasl.qop", "auth-conf");

try {
    ctx = new InitialDirContext(env);
    Attributes attrs = ctx.getAttributes("o=globus, o=grid");
} catch(Exception e) {
    System.err.println("JndiTest failed: " + e.getMessage());
} finally {
    if (ctx != null) { try { ctx.close(); } catch(Exception e) {} }
}
```



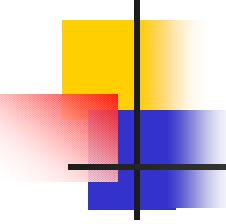
Netscape Directory Example

```
LDAPConnection Id = new LDAPConnection();

try {
    Id.setOption( LDAPv2.PROTOCOL_VERSION, new Integer(3) );
    Id.connect( "globus.isi.edu", 5000 );

    Id.authenticate( binddn, pwd );

    LDAPEntry findEntry = Id.read( "o=globus, o=grid" );
} catch(Exception e) {
    e.printStackTrace();
} finally {
    try { Id.disconnect(); } catch(Exception ee) {}
}
```



Netscape Directory Example

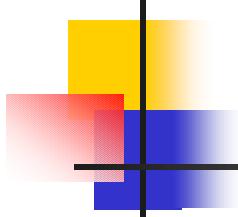
```
LDAPConnection Id = new LDAPConnection();

Hashtable props = new Hashtable();
props.put("javax.security.sasl.client.pkgs", "org.globus.mds.gsi.netscape" );
props.put("javax.security.sasl.qop", "auth-conf");

try {
    Id.setOption( LDAPv2.PROTOCOL_VERSION, new Integer(3) );
    Id.connect( "globus.isi.edu", 5000 );

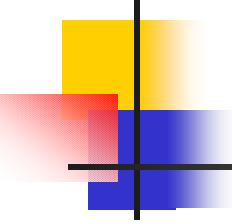
    Id.authenticate( binddn, new String [] {GSIMechanism.NAME}, props, null );

    LDAPEntry findEntry = Id.read( "o=globus, o=grid" );
} catch(Exception e) {
    e.printStackTrace();
} finally {
    try { Id.disconnect(); } catch(Exception ee) {}
}
```



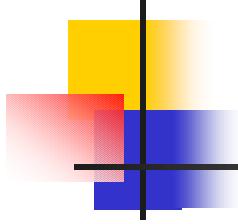
Properties

- “javax.security.sasl.client.pkgs”
 - Specifies package name(s) where to find the SASL mechanisms
 - Use “*org.globus.mds.gsi.netscape*” for Netscape library
 - Use “*org.globus.mds.gsi.jndi*” for JNDI library
 - (they'll be merged together at one point)



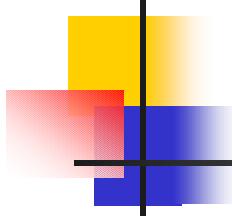
Properties (cont.)

- “javax.security.sasl.qop”
 - Specifies ‘Quality of Protection’ property.
 - It is a comma-separated list of qop values (in preference order)
 - “*auth*” – authentication only
 - “*auth-int*” – authentication with integrity protection (GSI without encryption)
 - “*auth-conf*” - authentication with integrity and privacy protection (GSI with encryption)
 - Defaults to “*auth*” if not specified



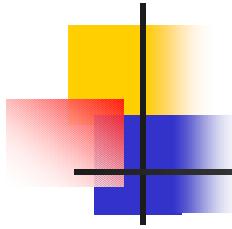
Properties (cont.)

- “javax.security.sasl.strength”
 - Specifies the strength of the encryption
 - It is not used currently
- “org.globus.mds.gsi.proxy”
 - Specifies the GlobusProxy to use
 - GSI credentials to use for SASL authentication
 - Will use default user proxy if not specified



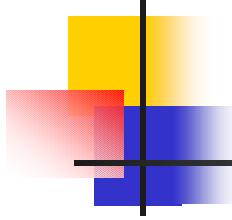
Specifying GSI credentials

```
GlobusProxy proxy = null;  
try {  
    proxy = GlobusProxy.getDefaultUserProxy();  
} catch(GlobusProxyException e) {  
    System.err.println("Failed to load default user proxy: " + e.getMessage());  
    System.exit(1);  
}  
  
env.put("org.globus.mds.gsi.proxy", proxy);  
.
```



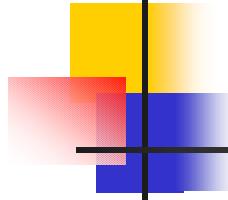
JNDI-specific issues

- Problem
 - Only when QOP is “auth-conf” or “auth-int”
 - The library will hang due to a Thread.interrupt() bug in JVM
 - Occurs on most JVM 1.3.X and some JVM 1.2.2
- Solution/Work-around
 - Don’t request any protections!
 - J2SE 1.4 has the problem fixed on all platforms



Netscape-specific issues

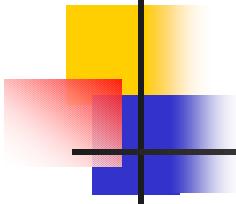
- Problem
 - When QOP is “auth-conf” or “auth-int”
 - Sometimes an exception is thrown in the library code due to a synchronization problem
- Solution/Work-around
 - Use my patched version of the library
 - The patched Idapjdk.jar file is in the Java CoG cvs.
 - The source code is available from my web site:
 - (<http://www.mcs.anl.gov/~gawor/notes/>)
 - Seems to work with any JVM



What's Coming

(larger projects)

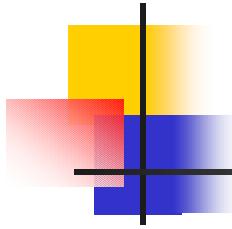
- Full support for GridFTP protocol
 - Multiple stripes, parallel levels, partial file access, etc.
- Replica Catalog library
 - Mostly implemented. It is based on JNDI.
- Replica Management library



What's Coming

(smaller projects)

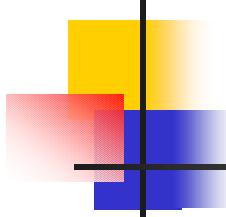
- Switch to to a free (for commercial use)
SSL/JCE security package
 - JSSE, Cryptix, IBM PKIX library, etc.
- Miscellaneous
 - More code examples
 - Improve documentation
 - Updated RSL parser



What's Coming

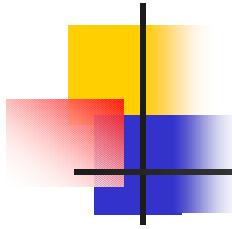
(experimental)

- Gatekeeper and JobManager
- Smart Card (PKCS11) support
- J2SE 1.4 enhancements
 - Kerberos V5 support
 - Asynchronous I/O
 - IPv6 support
 - SOCKS 5 support (for firewalls)
 - and more



Misc. Issues

- The detailed Java CoG Kit development plan will be available on the web page
- We want to set up an issue tracking system (for bugs, requests, etc.)
 - Set up our own (Bugzilla, etc.)
 - Sourceforge.net
 - We have to clear it first with the legal department



Questions?

- More information
 - <http://www.globus.org/cog/java>
- Mailing list
 - java@globus.org
- Email addresses
 - Jarek Gawor <gawor@mcs.anl.gov>
 - Peter Lane <lane@mcs.anl.gov>
 - Gregor von Laszewski <gregor@mcs.anl.gov>
 - Nell Rehn <rehn@mcs.anl.gov>